

New ASTM Standards: New distresses added to comply with ASTM D5340-10 and D6433-09, both published in ASTM Volume 04.03, 2010.

Use	Surface Type	Old Distress	New Distress	Deduct Curve
Airfield	AC	52 Weathering & Raveling	52 Raveling	No Change
			57 Weathering	New
	PCC	70 Scaling (Included ASR)	70 Scaling	New
			76 ASR	New
Roadway	AC	19 Weathering & Raveling	19 Raveling	Same, but no low severity
			20 Weathering	New

ASTM Upgrade Info

With PAVER 6.5 installed opening a database file in either PAVER 6.5 or PCASE 2.09 will convert all distress information to the new 2010 ASTM Standards as indicated below. **This change is irreversible.** If PAVER 6.5 is uninstalled, any PAVER or PCASE files opened when PAVER 6.5 was installed, will not be usable with prior versions of PAVER or any version of PCASE unless PAVER 6.5 is reinstalled.

Use & Surface Type	Old (E60) Distresses	New 2010 ASTM Distresses	Deduct Curve
Airfield - Asphalt	52 W&R - L	52 Raveling - L	No Change
	52 W&R - M	52 Raveling - M	No Change
	52 W&R - H	52 Raveling - H	No Change
Airfield - Concrete	70 Scaling - L	70 Scaling - L	New
	70 Scaling - M	70 Scaling - M	New
	70 Scaling - H	70 Scaling - H	New
Roadway -Asphalt	19 W&R - L	20 Weathering - M	New
	19 W&R - M	19 Raveling - M	No Change
	19 W&R - H	19 Raveling - H	No Change

If you would like to proceed, click Yes. If not, uninstall PAVER 6.5 and install 5.3.7 or 6.1.6.

RAVELING (52)

Description

Raveling is the dislodging of coarse aggregate particles from the pavement surface.

Dense Mix Severity Levels

As used herein, coarse aggregate refers to predominant coarse aggregate sizes of the asphalt mix. Aggregate clusters refer to when more than one adjoining coarse aggregate piece is missing. If in doubt about a severity level, three representative areas of 1 square yard (1 square meter) each should be examined and the number of missing coarse aggregate particles counted.

L

Low severity occurs if any one of these conditions exist: (1) In a square yard (square meter) representative area, the number of coarse aggregate particles missing is between 5 and 20. (2) Missing aggregate clusters is less than 2 percent of the examined square yard (square meter) area. In low severity raveling, there is little or no FOD potential.

M

Medium severity occurs if any one of these conditions exist: (1) In a square yard (square meter) representative area, the number of coarse aggregate particles missing is between 21 and 40. (2) Missing aggregate clusters is between 2 and 10 percent of the examined square yard (square meter) area. In medium severity raveling, there is some FOD potential.

H

High severity occurs if any one of these conditions exist: (1) In a square yard (square meter) representative area, the number of coarse aggregate particles missing is over 40. (2) Missing aggregate clusters is more than 10 percent of the examined square yard (square meter) area. In high severity raveling, there is significant FOD potential.

How To Measure

Raveling is measured in square feet (square meters) of surface area. Mechanical damage caused by hook drags, tire rims, or snowplows is counted as areas of high severity raveling.





52 RAVELING

RAVELING (52) (CONTINUED)

Slurry Seal/ Coal Tar Over Dense Mix Severity Levels

L (1) The scaled area is less than 1 percent. (2) In the case of coal tar where pattern cracking has developed, the surface cracks are less than 1/4 inch (6 mm) wide.

M (1) The scaled area is between 1 and 10 percent. (2) In the case of coal tar where pattern cracking has developed, the cracks are 1/4 inch (6 mm) wide or greater.

H (1) The scaled area is over 10 percent. (2) In the case of coal tar the surface is peeling off.

How To Measure

Raveling is measured in square feet (square meters) of surface area. Mechanical damage caused by hook drags, tire rims, or snowplows is counted as areas of high severity raveling.



LOW



MEDIUM



HIGH

RAVELING (52) (CONTINUED)

Porous Friction Course Severity Levels

L In a 1 square foot (1/10 square meter) representative sample, the number of aggregate pieces missing is between 5 and 20 and/ or the number of missing aggregate clusters does not exceed 1.

M In a 1 square foot (1/10 square meter) representative sample, the number of aggregate pieces missing is between 21 and 40 and/ or the number of missing aggregate clusters is greater than 1 but does not exceed 25 percent of the area.

H In a 1 square foot (1/10 square meter) representative sample, the number of aggregate pieces missing is over 40 and/ or the number of missing aggregate clusters is greater than 25 percent of the area.

How To Measure

Raveling is measured in square feet (square meters) of surface area. Mechanical damage caused by hook drags, tire rims, or snowplows is counted as areas of high severity raveling.



LOW

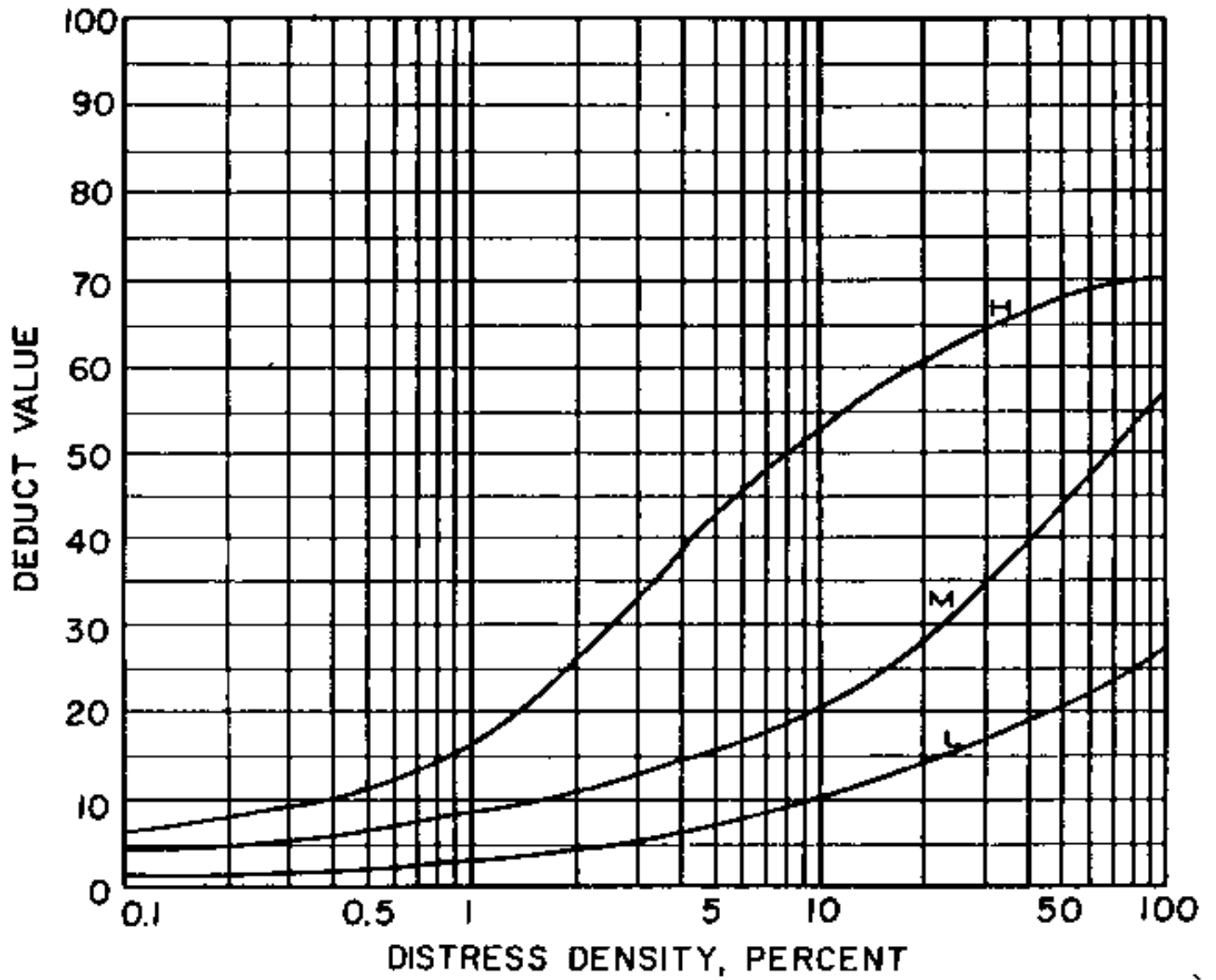


MEDIUM



HIGH

AC Airfield: Raveling (52)



WEATHERING (SURFACE WEAR) - DENSE MIX ASPHALT (57)

Description

The wearing away of the asphalt binder and fine aggregate matrix from the pavement surface.

Severity Levels

- L** Asphalt surface beginning to show signs of aging which may be accelerated by climatic conditions. Loss of the fine aggregate matrix is noticeable and may be accompanied by fading of the asphalt color. Edges of the coarse aggregates are beginning to be exposed (less than 0.05 inches or 1 mm). Pavement may be relatively new (as new as 6 months old).
- M** Loss of fine aggregate matrix is noticeable and edges of coarse aggregate have been exposed up to $\frac{1}{4}$ width (of the longest side) of the coarse aggregate due to the loss of fine aggregate matrix.
- H** Edges of coarse aggregate have been exposed greater than $\frac{1}{4}$ width (of the longest side) of the coarse aggregate. There is considerable loss of fine aggregate matrix leading to potential or some loss of coarse aggregate.

How To Measure

Surface wear is measured in square feet (square meters). Surface wear is not recorded if medium or high severity raveling is recorded.



LOW

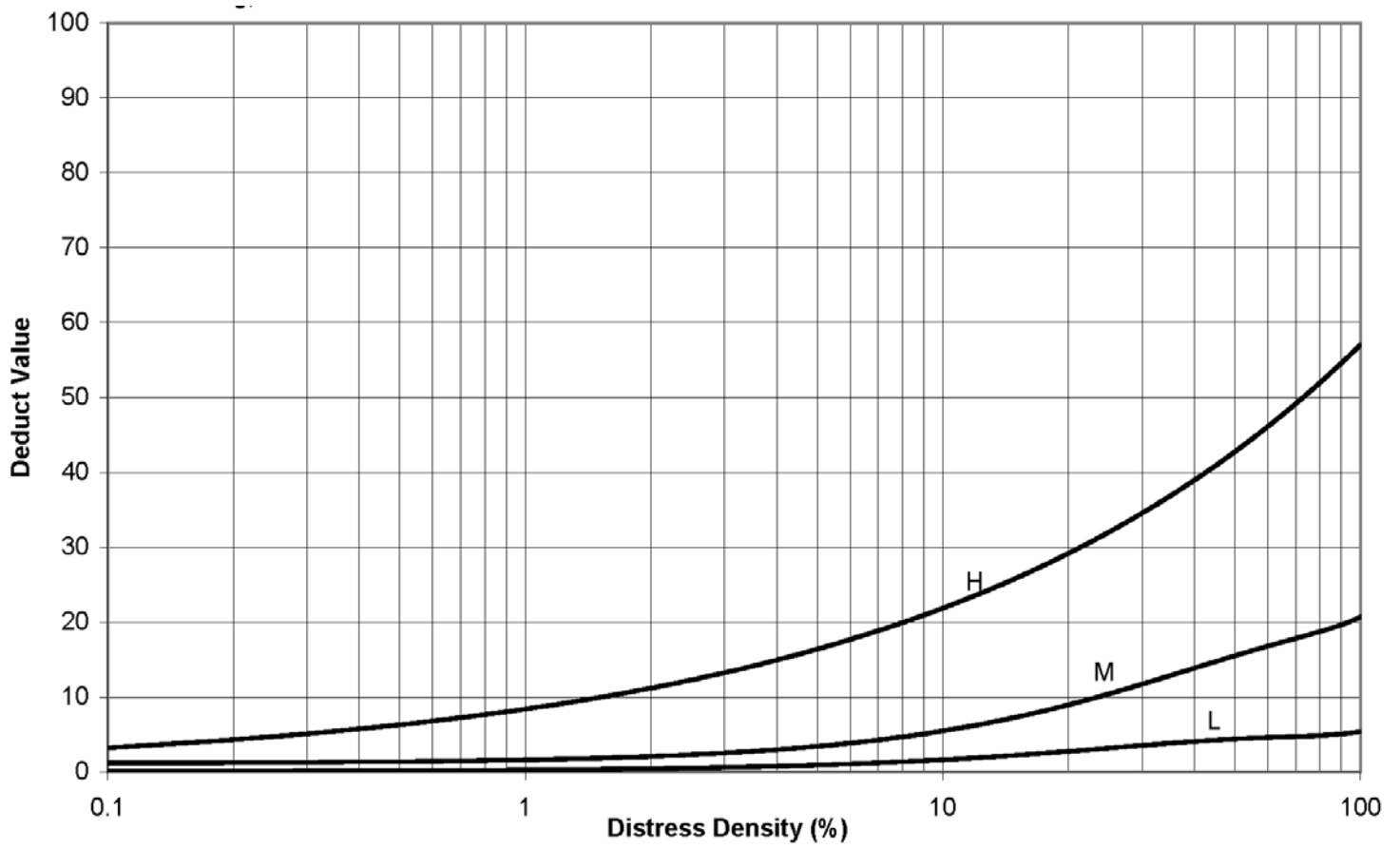


MEDIUM



HIGH

AC Airfield: Weathering (57)



SCALING (70)

Description

Surface deterioration caused by construction defects, material defects and environmental factors. Generally scaling is exhibited by delamination or disintegration of the slab surface to the depth of the defect.

Construction defects include: over-finishing, addition of water to the pavement surface during finishing, lack of curing, attempted surface repairs of fresh concrete with mortar. Generally this occurs over a portion of a slab.

Material defects include: inadequate air entrainment for the climate. Generally this occurs over several slabs that were affected by the concrete batches.

Environmental factors: freezing of concrete before adequate strength gained or thermal cycles from certain aircraft. Generally over a large area for freezing, and isolated areas for thermal effects.

Typically, the FOD from scaling is removed by sweeping, but the concrete will continue to scale until the affected depth is removed or expended.

Severity Levels

- L** Minimal loss of surface paste that poses no FOD hazard. No FOD potential.
- M** The loss of surface paste that poses some FOD potential including isolated fragments of loose mortar, exposure of the sides of coarse aggregate (less than 1/4 of the width of coarse aggregate), or evidence of coarse aggregate coming loose from the surface.
- H** The high severity is associated with low durability concrete that will continue to pose a high FOD hazard; normally the layer of surface mortar is observable at the perimeter of the scaled area, and is likely to continue to scale due to environmental or other factors. Indication of high severity FOD is that routine sweeping is not sufficient to avoid FOD issues.

How To Count

If two or more levels of severity exist on a slab, the slab is counted as one slab having the maximum level of severity. If "D" cracking or ASR is counted, scaling is not counted.



HIGH

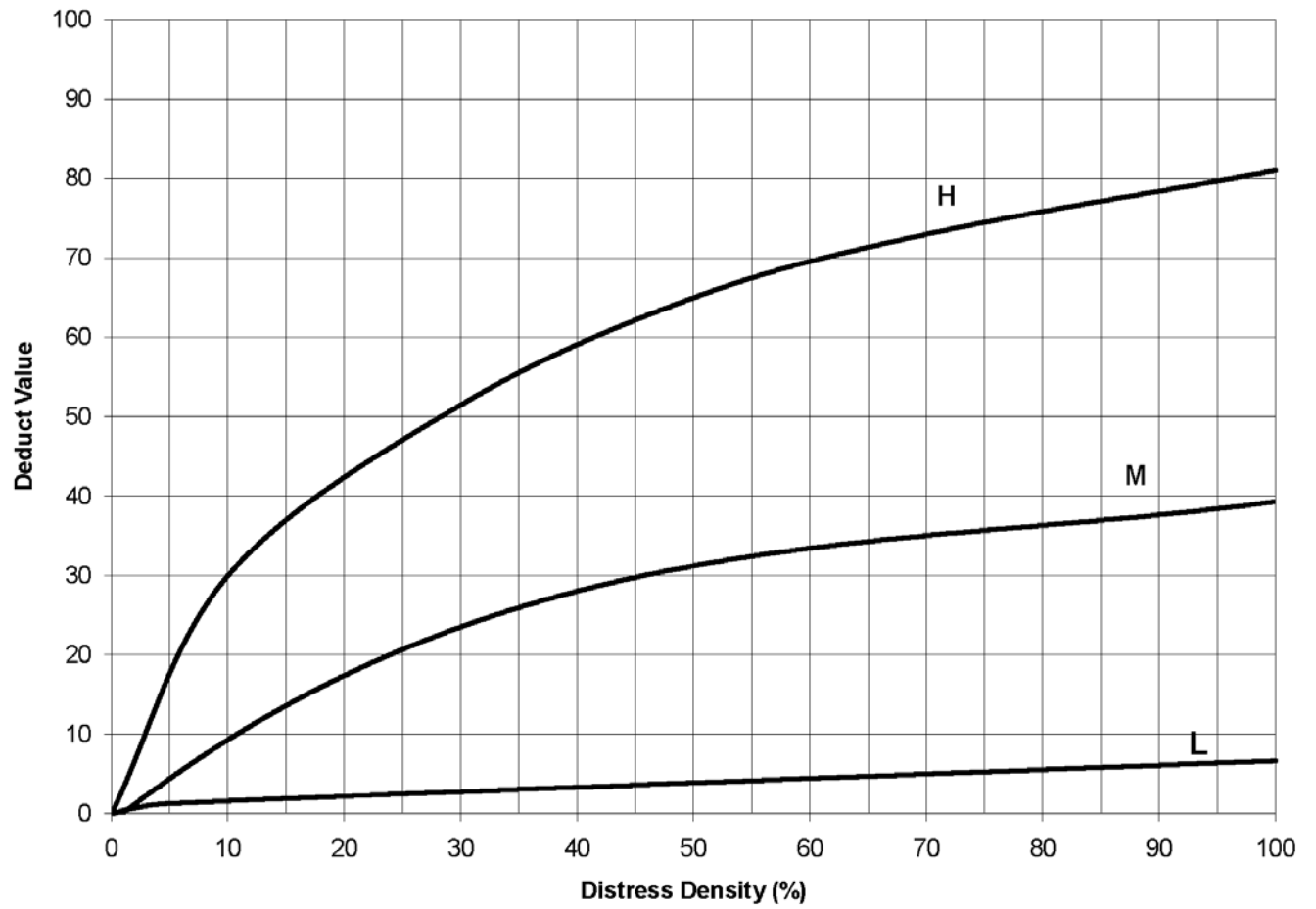


MEDIUM



LOW

PCC Airfield: Scaling (70)



ALKALI SILICA REACTION (ASR) (76)

Description

ASR is caused by chemical reaction between alkalis and certain reactive silica minerals which form a gel. The gel absorbs water, causing expansion which may damage the concrete and adjacent structures. Alkalis are most often introduced by the portland cement within the pavement. ASR cracking may be accelerated by chemical pavement deicers.

Visual indicators that ASR may be present include:

1. Cracking of the concrete pavement (often in a map pattern)
2. White, brown, gray or other colored gel or staining may be present at the crack surface
3. Aggregate popouts
4. Increase in concrete volume (expansion) that may result in distortion of adjacent or integral structures or physical elements. Examples of expansion include shoving of asphalt pavements, light can tilting, slab faulting, joint misalignment, and extrusion of joint seals or expansion joint fillers.

Because ASR is material-dependent, ASR is generally present throughout the pavement section. Coring and concrete petrographic analysis is the only definitive method to confirm the presence of ASR. The following should be kept in mind when identifying the presence of ASR through visual inspection:

1. Generally ASR distresses are not observed in the first few years after construction. In contrast, plastic shrinkage cracking can occur the day of construction and is apparent within the first year.
2. ASR is differentiated from D-Cracking by the presence of cracking perpendicular to the joint face. D-Cracking predominantly develops as a series of parallel cracks to joint faces and linear cracking within the slab.
3. ASR is differentiated from Map Cracking/ Scaling by the presence of visual signs of expansion.

Severity Levels

L

Minimal to no Foreign Object Damage (FOD) potential from cracks, joints or ASR related popouts; cracks at the surface are tight (predominantly 1 mm or less). Little to no evidence of movement in pavement or surrounding structures or elements.

M

Some FOD potential; increased sweeping or other FOD removal methods may be required. May be evidence of slab movement and/ or some damage to adjacent structures or elements.

Medium ASR distress is differentiated from low by having one or more of the following: increased FOD potential, increased cracking of the slab, some fragments along cracks or at crack intersections present, surface popouts of concrete may occur, pattern of wider cracks (predominantly 1 mm or wider) that may be subdivided by tighter cracks.

H

One or both of the following exist: 1) Loose or missing concrete fragments which pose high FOD potential, 2) Slab surface integrity and function significantly degraded and pavement requires immediate repair; may also require repairs to adjacent structures or elements.

How To Count

No other distresses should be recorded if high severity ASR is recorded.

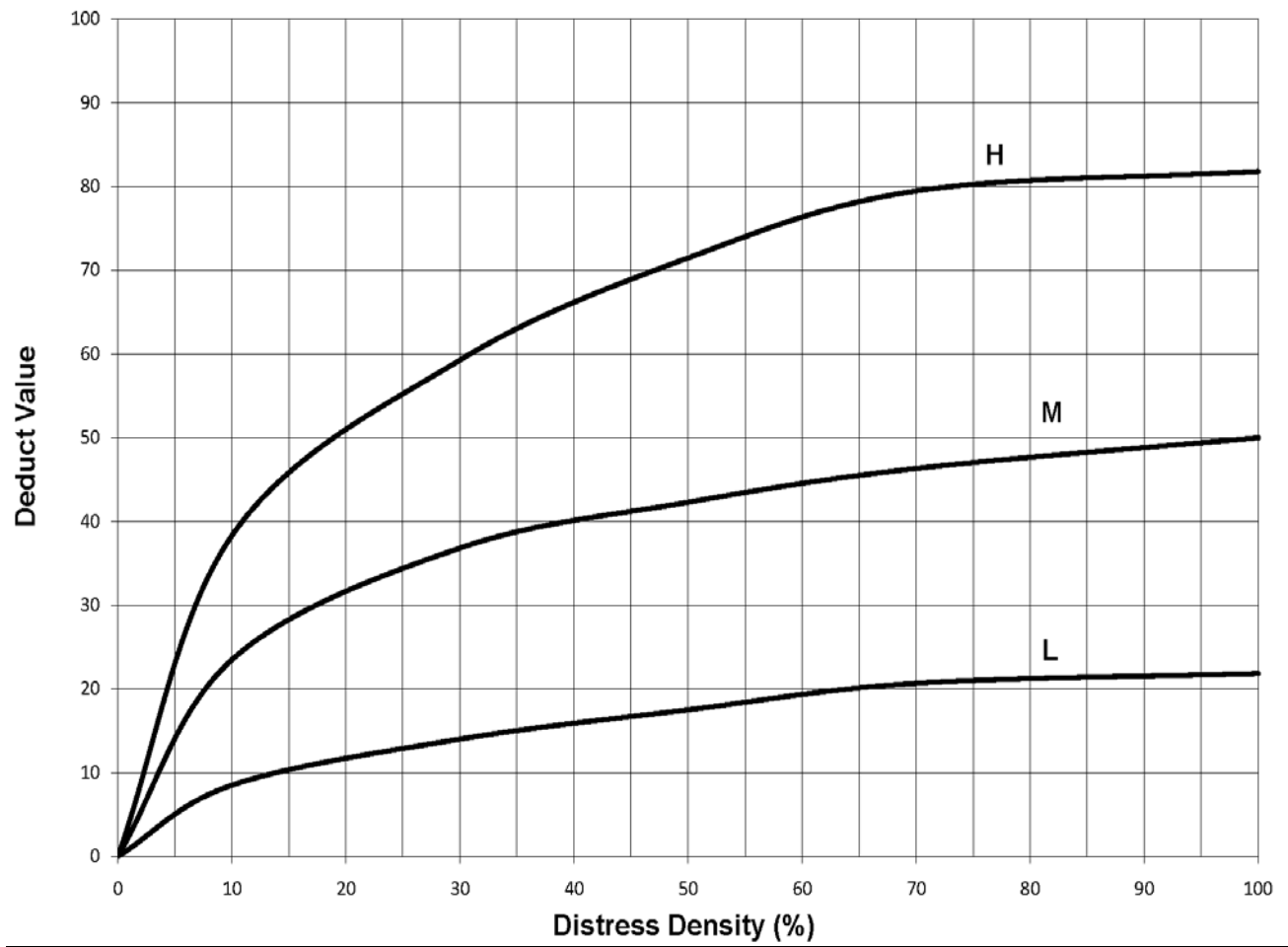


LOW

MEDIUM

HIGH

PCC Airfield: ASR (76)



RAVELING (19)

Description

Raveling is the dislodging of coarse aggregate particles. Raveling may be caused by insufficient asphalt binder, poor mixture quality, insufficient compaction, segregation, or stripping.

Dense Mix Severity Levels

As used herein, coarse aggregate refers to predominant coarse aggregate size of the asphalt mix, and aggregate clusters refers to when more than one adjoining coarse aggregate piece is missing. If in doubt about a severity level, three representative areas of one square yard each (square meters) should be examined and the number of missing aggregate particles/ clusters is counted.

M Considerable loss of coarse aggregate, greater than 20 per square yard (square meter), and/ or clusters of missing coarse aggregate are present.

H Surface is very rough and pitted, may be completely removed in places.

How To Measure

Raveling is measured in square feet (square meters) of surface area. Mechanical damage caused by such things as hook drags, tire rims, or snowplows is counted as raveling. If raveling is present, weathering (surface wear) is not recorded.

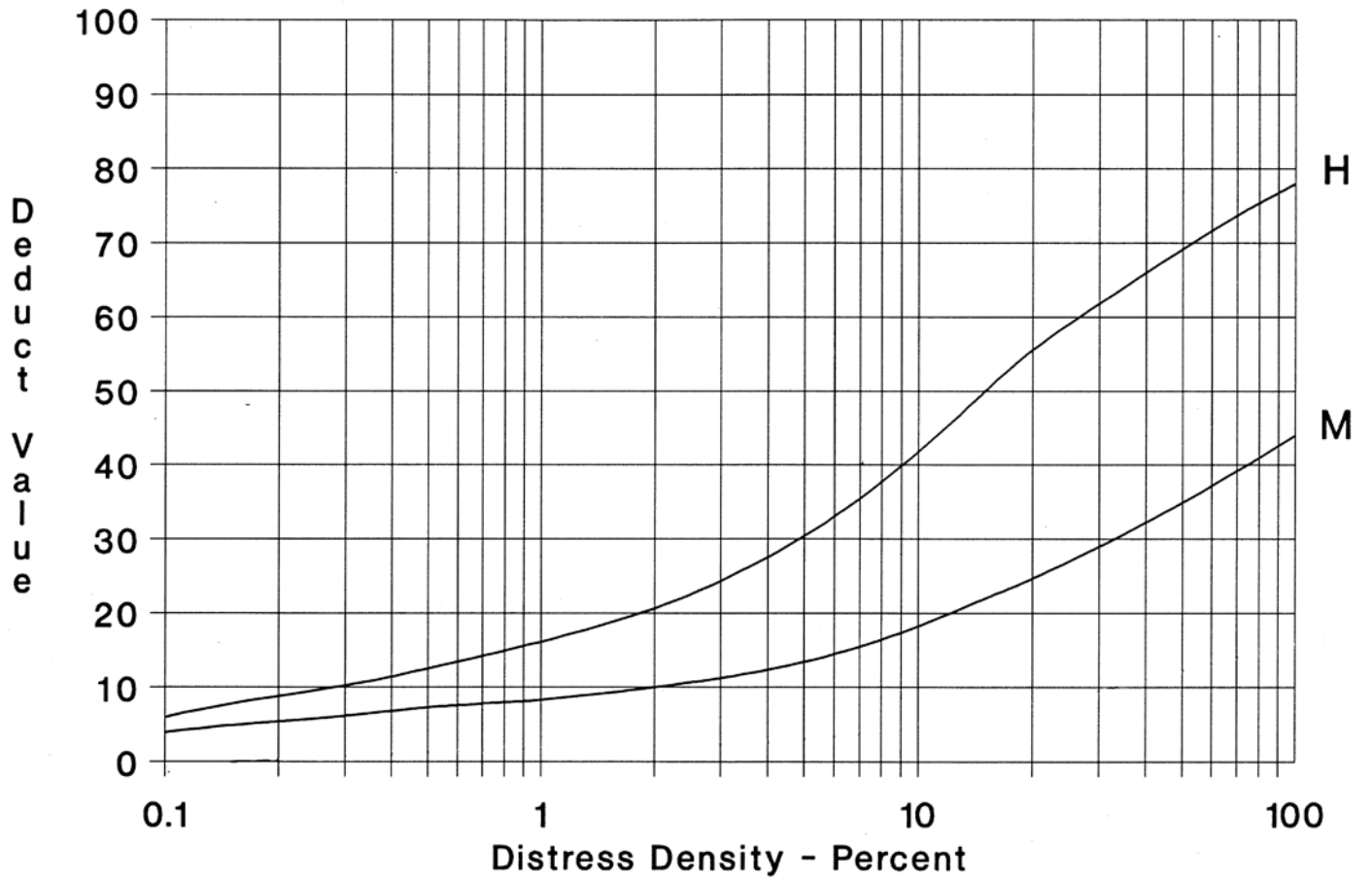


HIGH



MEDIUM

AC Roadway: Raveling (19)



WEATHERING (SURFACE WEAR) - DENSE MIX ASPHALT (20)

Description

The wearing away of the asphalt binder and fine aggregate matrix.

Severity Levels

As used herein, coarse aggregate refers to predominant coarse aggregate size of the asphalt mix. Loss or dislodging of coarse aggregate is covered under raveling

Surface wear is normally caused by oxidation, inadequate compaction, insufficient asphalt content, excessive natural sand, surface water erosion, and traffic. Weathering occurs faster in areas with high solar radiation.

L Asphalt surface beginning to show signs of aging which may be accelerated by climatic conditions. Loss of the fine aggregate matrix is noticeable and may be accompanied by fading of the asphalt color. Edges of the coarse aggregates are beginning to be exposed (less than 0.05 in. or 1 mm). Pavement may be relatively new (as new as 6 months old).

M Loss of fine aggregate matrix is noticeable and edges of coarse aggregate have been exposed up to $\frac{1}{4}$ width (of the longest side) of the coarse aggregate due to the loss of fine aggregate matrix.

H Edges of coarse aggregate have been exposed greater than $\frac{1}{4}$ width (of the longest side) of the coarse aggregate. There is considerable loss of fine aggregate matrix leading to potential or some loss of coarse aggregate.

How To Measure

Surface Wear is measured in square feet (square meters). Surface Wear is not recorded where medium and/ or high severity raveling is recorded.



LOW



MEDIUM



HIGH

20 WEATHERING

AC Roadway: Weathering (20)

